1-4 11 13 14

PHYSICAL SCIENCE

Nuclear Chemistry WS 1

1. Complete the following table for the following subatomic particles:

atomic particle	Symbol	Location	Charge	Mass
Protons	P (2)	NUCLEUS	+	1
Neutrons	N	NUCLEUS	NO CHARGE	1
Electrons	E	ELECTRON ORBITS	−	0

2. Looking at your periodic table, label the mass # and atomic # in the full atomic symbol.

MASS # --> ^{236}U

ATOMIC # --> $_{92}U$

3. Using the full atomic symbol from above, complete the following with the appropriate symbol indicating the subatomic particle known from each number:

top = P + N # bottom = P

4. Complete the following table **for neutral atoms**. Read down a column!

Full atomic symbol (isotope notation)	$^{236}_{92}U$	$^{234}_{92}U$	$^{209}_{84}Po$	$^{4}_{2}He$	$^{131}_{54}Xe$
Name (isotope form)	Uranium – 236	URANIUM-234	POLONIUM-209	HELIUM-4	XENON-131
Atomic number	92	92	84	2	54
Mass	236	234	209	4	131
# of electrons	92	92	84	2	54
# of protons	92	92	84	2	54
# of neutrons	144	142	125	2	77

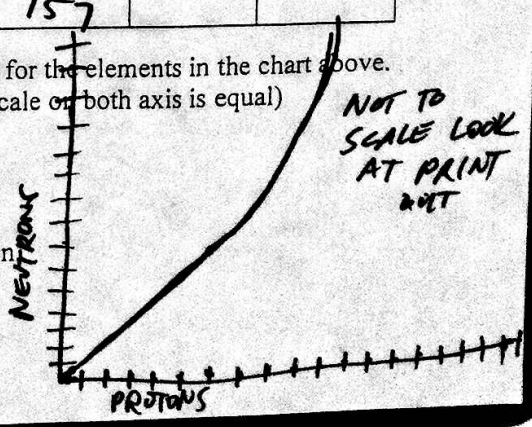
5. Give three isotopes of Hydrogen in the full atomic symbol form (mass = 1,2,3)

$^{1}_{1}H$ $^{2}_{1}H$ $^{3}_{1}H$

6. Using your periodic table, fill in the most likely number of neutrons for each atom present below.

protons	neutrons	protons	neutrons	protons	neutrons	protons	neutrons	protons	neutrons
1	0	11	12	24	27	64	93	104	163
2	2	12	12	28	30	68	99	108	162
3	4	13	14	32	40	72	106	112	173
4	5	14	14	36	47	76	114		
5	6	15	16	40	51	80	120		
6	6	16	16	44	57	84	129		
7	7	17	18	48	64	88	138		
8	8	18	22	52	75	92	146		
9	10	19	20	56	81	96	151		
10	10	20	20	60	84	100	157		

7. Flip your composition notebook sideways. Graph protons (x) versus neutrons (y) for the elements in the chart above. Give an appropriate title and axes labels. Do not include a best-fit line. (make sure scale on both axis is equal)



NOT TO SCALE LOOK AT PRINT OUT

8. What is a nuclide?

ATOM CHARACTERIZED BY # OF P, N AND NUCLEAR NRG STATE

9. What makes one nuclide stable and another of the same element unstable? Explain.

10. If an atom is not stable, it is said to be RADIOACTIVE.

NUCLEAR CHEMISTRY HAVE STUDENTS DO 1-4 11 13 14

Name _____ Period _____

NUCLEAR EQUATIONS WORKSHEET

1. Write a nuclear equation for the alpha decay of $^{231}_{91}Pa$.

$$^{231}_{91}Pa \rightarrow {}^{4}_{2}He + {}^{227}_{89}Ac$$

2. Write a nuclear equation for the beta decay of $^{223}_{87}Fr$.

$$^{223}_{87}Fr \rightarrow {}^{0}_{-1}e + {}^{223}_{88}Ra$$

3. Write a nuclear equation for the alpha decay of $^{149}_{62}Sm$.

$$^{149}_{62}Sm \rightarrow {}^{4}_{2}He + {}^{145}_{60}Nd$$

4. Write a nuclear equation for the beta decay of $^{165}_{61}Pm$.

$$^{165}_{61}Pm \rightarrow {}^{0}_{-1}e + {}^{165}_{62}Sm$$

5. Write a nuclear equation for the alpha decay of $^{249}_{101}Md$.

$$^{249}_{101}Md \rightarrow {}^{4}_{2}He + {}^{245}_{99}Es$$

6. Write a nuclear equation for the alpha decay of $^{146}_{62}Sm$.

$$^{146}_{62}Sm \rightarrow {}^{4}_{2}He + {}^{142}_{60}Nd$$

7. Write a nuclear equation for the beta decay of $^{198}_{85}At$.

$$^{198}_{85}At \rightarrow {}^{0}_{-1}e + {}^{198}_{86}Rn$$

8. Write a nuclear equation for the alpha decay of $^{150}_{64}Gd$.

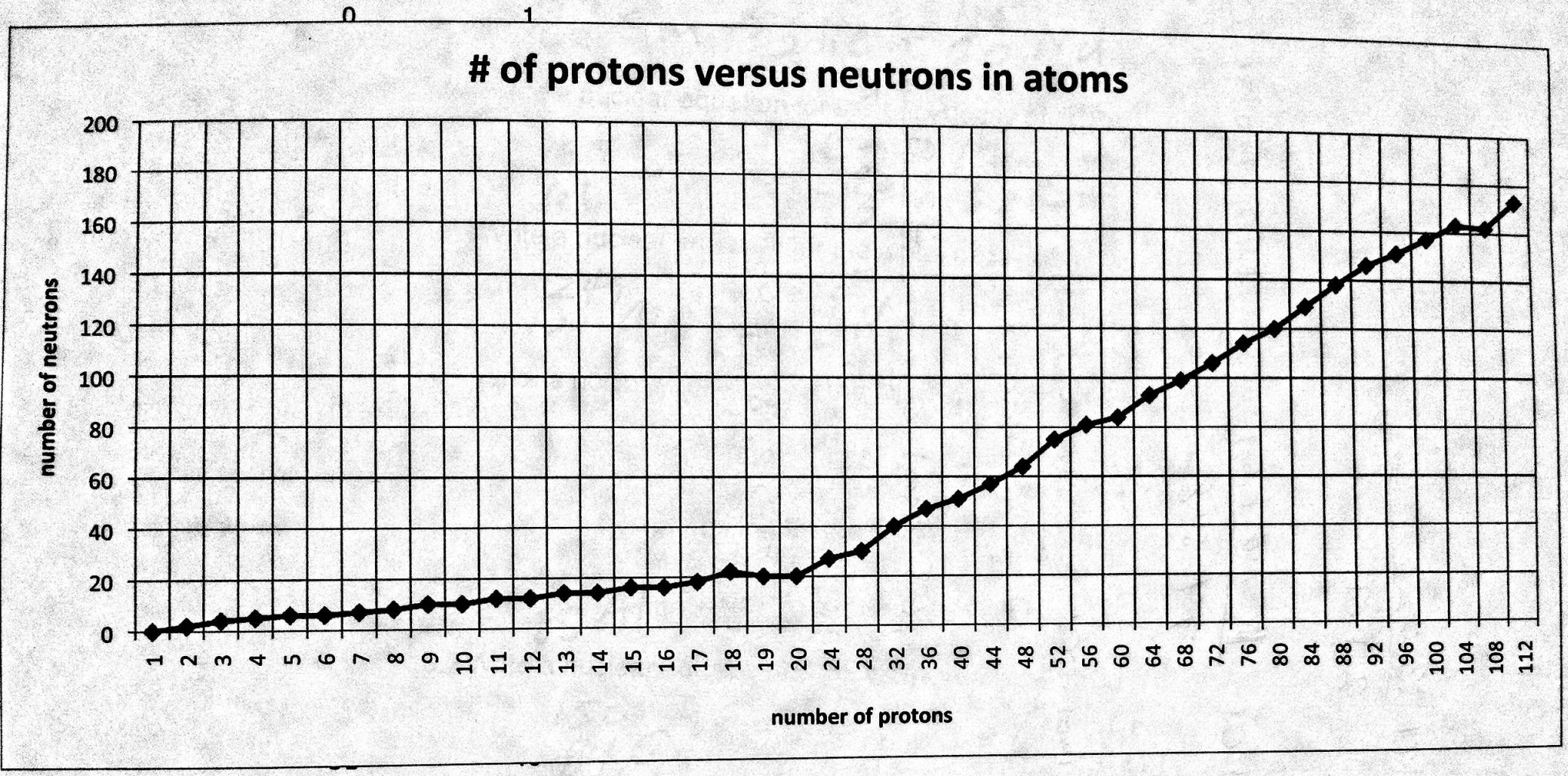
$$^{150}_{84}Gd \rightarrow {}^{4}_{2}He + {}^{146}_{82}Pb$$

9. Write a nuclear equation for the beta decay of $^{152}_{54}Xe$.

$$^{152}_{54}Xe \rightarrow {}^{0}_{-1}e + {}^{152}_{55}Cs$$

10. Write a nuclear equation for the beta decay of $^{120}_{55}Cs$.

$$^{120}_{55}Cs \rightarrow {}^{0}_{-1}e + {}^{120}_{56}Ba$$



57	44
64	48
75	52
81	56
84	60
93	64
99	68
106	72
114	76